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Transient Behavior in Binary Nucleation[1] Barbara E. Wyslouzil, Worcester Polytechnic Institute, Worcester MA 01609 and Gerald Wilemski, Lawrence Livermore National Laboratory, Livermore CA 94551-9900.

Transient behavior in binary nucleation can dramatically change both the rate and pathway of particle formation from that expected on the basis of steady state nucleation. For example, our numerical solutions of the discrete kinetics equations governing the evolution of binary cluster concentrations show that nucleation via a ridge crossing path occurs naturally as an intermediate state enroute to saddle point nucleation. These effects are important when the timescale for creating the supersaturation is short compared to the time needed to set up the steady state cluster distribution. Our numerical results show that our analytical estimates of this time are high by no more than a factor of 2.

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